BOOK REVIEWS.

THE GEOGRAPHY OF THE FLOWERING PLANTS. By Ronald Good. (London: Longmans Green & Co.) Second Edition, 1953, xiv + 452, with 75 line drawings, 9 maps in colour, 16 photogravure plates.

Geographical Distribution is perhaps the most complicated branch of biological science: it is certainly one of the most enthralling. To follow the migrations of plants, each species with its own individual potentialities, each species undergoing evolutionary changes and ramifications through all the changes of earth's climate and terrain, some gradual, some almost catastrophic, when almost the only facts available are the end-terms of the whole age-long process, and when there are many gaps in our knowledge of these and endless differences of opinion as to their status and relationships, this is surely a task requiring a vast store of information and the ability and imagination needed to estimate the weight and effect of the many variable factors involved.

To this task Professor Good has applied himself in masterly fashion, and his book, now available in a new and revised edition, is to-day certainly the most adequate, balanced and stimulating presentation of the facts and factors of the distribution of flowering plants over the globe.

Detailed criticism of such a book is impossible, but one or two aspects of Professor Good's treatment of the subject may be noted. The first half of his book presents the facts to be recorded and, as it were, faced—their complexity, their apparent anomalies and freakishness: one's comprehension of this is assisted by maps of outstanding instances of distribution of species and groups, these providing the most valuable pointers to past geographical changes and floristic history. The second half of the book deals with the various factors which have come into play in the production of to-day's distribution and which may be expected to continue into the indefinite future.

"One of the most perplexing things about Angiosperm geography is its inherent chaos" says Professor Good; "which expresses itself in the difficulty of accounting satisfactorily for any appreciable portion of the total facts by any one single theoretical explanation of the more detailed sort." It is interesting to note that the author, in contrast to much—though not all—geological opinion, throws a good deal of weight on continental displacement as a factor. Indeed much of the plant-geographical work of the future will no doubt be concerned with a study of the problems of the "tolerance" and rapidity of migration of the flowering plants in relation to the gradual severing of their continental areas: and of the time problem as to the epoch of origin, primary evolution and distribution of the more primitive groups in relation to the period and rapidity of continental split.

It is pleasant for botanists in the southern hemisphere to note that Professor Good has no narrow northern outlook in his attack on distributional problems. Although plant distribution in the northern hemisphere has been subject to violent catastrophes in the form of recent glacial periods, which have brought about great changes from which, as Professor Good says, they are clearly recovering at the present day, yet the distribution of plants in the southern hemisphere, with its widely spaced land masses, is the result of far more fundamental world-factors than those caused by the recent ice-encroachments of the north.

While Professor Good devotes chapters to plant distribution in that botanically well known country Great Britain, and even to the study of one particular county, Dorset, this serves the purpose of illustrating the vastness of the whole field. In his treatment of the wider problems he shows a breadth and range which are eminently satisfactory.

The book is illustrated by several admirable plates, among which it is interesting to notice a reproduction of Schimper's magnificent classical photograph of Java forest vegetation, and also Mrs. Levyns' photograph of Karoo succulents first published in the Journal of the Botanical Society of S. Africa: there are also photographs of Protea cynaroides at the Cape, Central African Lobelias and Senecios, a Transvaal Euphorbia—in fact Africa is well treated in this respect. The numerous line drawings, maps and diagrams are an important and illuminating feature of the book.

Professor Good's book can be warmly recommended for its broad and at the same time detailed presentation of a stupendous and fascinating subject, "that almost keystone of the laws of creation" as Charles Darwin called it.

R. H. Compton.

Physiology of Seeds by W. Crocker and L. V. Barton. (Waltham, Mass.: The Chronica Botanica Co.; London, W.C.2: Wm. Dawson and Sons, Ltd.) Price, $6.50.

The study of seeds and seedlings has a great deal of fascination and enters into a wide range of topics, even when the field is restricted, as with the book under review, to seed physiology, which necessarily includes seedling physiology. Such a book may be expected to appeal to a large number of botanists, including those primarily concerned with horticulture and agriculture.

Physiology of Seeds has been written by two investigators who have carried out a considerable amount of research on seeds and seedlings at the Boyce Thompson Institute for Plant Research. Beacause of the subject and the standing of the two authors the reviewer looked forward with much pleasure to the reading of this book. It must be admitted that taken as a whole the book was not of the quality which was anticipated. In places the style is somewhat clumsy and lacks lucidity, and the English is sometimes bad. Parts of the book make heavy reading, and it is difficult to avoid the impression that in dealing with certain topics the authors have not fully digested their material, and hence their treatment of parts of the subject assumes rather the character of a compilation. This applies especially to the earlier chapters. Additional diagrams would also have been advantageous.

A glance at the contents of the book indicates the wide range of topics considered. These include a brief account of certain structural features (Chap. 1); factors relating to seed germination (Chap. 2); chemical composition of seeds (Chaps. 3 and 4); permeability of seed membranes (Chap. 5); respiration of seeds (Chap. 6); factors affecting germination (Chaps. 7 and 8); dormancy in seeds (Chaps. 9 and 10); storage and life span of seeds (Chap. 11); chemical changes during seed development, after-ripening and vernalization, and chemical metabolic changes during germination (Chaps. 12 and 13); the enzymology of seeds and germination (Chap. 14); vernalization and embryo culture (Chaps. 15 and 16); transmission and control of seed borne diseases (Chap. 17). Wide as is the range of topics, it does not cover the whole field. Of this the authors are aware, and they call attention in the preface to one such omission, seed dispersal —a subject which is usually regarded as outside the field of physiology. Two other omissions might be noted. A short connected account of polyploidy in relation to size and germination of seeds and in relation to seed yield might have been included, especially as references are made to genetic factors. Under conditions affecting germination some account might also have been given of ethylene effects, extended possibly to describe the use of seedlings as means of detecting traces of the gas. Space could have been found for these topics by shortening the treatment of some other themes, such as the chemical composition of seeds, and possibly by omitting certain elementary statements on physiological processes which are scattered throughout the text.

Notwithstanding the criticisms which have been made, this is a valuable book, of interest to botanists in general as well as to the plant physiologists, horticulturists, foresters and agronomists. It brings to the notice of the reader a number of references which are readily overlooked as they are not always easily available and appear in publications which are unfamiliar to many botanists. Also, both explicitly and implicitly, leads are given to further research, which should make the book of value to other investigators of seed and seedling physiology.

Much space is devoted throughout the book to practical applications, and this should make the book useful to nurserymen and others concerned with the growing of plants, provided they have a background of physiological knowledge.

The later chapters are as a whole better than the earlier ones and mention may be made of the useful chapters on vernalization and embryo culture, and of the stimulating chapters on dormancy and storage and life span of seeds. Although the authors do not comment on the matter the parallels between seed and fruit storage and post-storage behaviour are of interest. In both cases low temperatures are of importance, and on withdrawal from store there is danger of rapid deterioration in both cases, if sufficient attention has not been paid to providing the best storage conditions. Of course, seeds can be kept at lower temperatures than fruits, and the storage moisture relationships are different.

The book can indirectly make a contribution to South African botany both "pure and applied". Little is known concerning the seed and seedling physiology of our native plants, and this book should stimulate a number of interesting and fruitful investigations bearing on the natural history and ecology of South African plants. The book will also be of value to those in South Africa concerned, directly or indirectly, with the commercial handling of seeds, in which activity there is room for much improvement.

WM. EDWYN ISAAC.

NEW ZEALAND POLLEN STUDIES. THE MONOCOTYLEDONS. By Lucy M. Cranwell. Bulletin of the Auckland Institute and Museum. No. 3. Pp. 1—91. Photographic frontispiece, 10 photographic plates, 66 text-figures and 1 map. (Harvard University Press, 1953.)

Miss Cranwell's "Pollen Studies" contains a very full account of the pollen of New Zealand Monocotyledons and is well illustrated with very numerous text-figures and photographic plates.

A somewhat unusual but very welcome feature of the work, and one which the South African palynologist will find of great value, is the general introduction containing a discussion of the basic and aberrant types of pollen-grain found in the Monocotyledons in general. There is a section on morphology and method, with a useful glossary of terms and an extensive bibliography.

Some of the genera treated are found in South Africa, e.g. Triglochin, Potamogeton, Typha, Hypoxis, Juncus, Carpha, Cladium and Carex. Three genera of Restionaceae are very fully described and illustrated. Of the Orchidaceae, information in great detail is given of twenty genera, as well as some valuable historical data on the family as a whole.

There is a "master-key" to the more important terms used in describing and classifying pollen forms in the Monocotyledons which the non-specialist botanical student will find of use, followed by a detailed key to the pollen of the genera and species and a tabulated summary of the sizes and main structural features of all the grains described in the text.

S. Garside.